



Anselm turmeda 8
Barcelona 08016

telf. : 93.359.57.35 - 93.276.01.56
<http://www.fundacion-dr-jordi-mas.org>
fundacion_mas_manjon@intercom.es

Glutamatergic Receptors Bibliography

*

(*) Cognitive Research Department

Bibliography

- Abbracchio, M.P., Brambilla, R., Ceruy, S., Kim, H.O., Von Lubitz, D.K., Jacobson, K.A. and Cattabeni, F. (1995) G protein-dependent activation of phospholipase C by adenosine A3 receptors in rat brain. Mol. Pharmacol. 48, 1038-1045.
- Agnati, L.F., Ferré, S., Lluis, C., Franco, R., and Fuxe, K. (2003) Molecular mechanisms and therapeutical implications of intramembrane receptor/receptor interactions among heptahelical receptors with examples from the striatopallidal GABA neurons. Pharmacol. Rev. 55, 509-550.
- Angers, S., Salahpour, A., Joly, E., Hilairet, S., Chelsky, D., Dennis, M., Bouvier, M. (2000) Detection of b2-adrenergic receptor dimerization in living cells using bioluminescence resonance energy transfer (BRET). Proc.Natl.Acad.Sci. USA 97, 3684-3689.
- Ango, F., Prezeau, L., Muller, T., Tu, J.C., Xiao, B., Worley, P.F., Pin, J.P., Bockaert, J. and Fagni, L. (2001) Agonist-independent activation of metabotropic glutamate receptors by the intracellular protein Homer. Nature 411, 962-965.
- Ango, F., Robbe, D., Tu, J.C., Xiao, B., Worley, P.F., Pin, J.P., Bockaert, J. And fagni, L. (2002) Homer-dependent cell surface expression of metabotropic glutamate receptor type 5 in neurons. Mol. Cell. Neurosci. 20, 323-329.
- Arrang, J.M. (1994) Pharmacological properties of histamine receptor subtypes.

Cell. Mol. Biol. 40, 275-281.

Baude A., Nusser Z., Roberts J. D. B., Mulvihill E., McIlhinney R. A. J. and Somogyi P. (1993) The metabotropic glutamate receptor (mGluR1a) is concentrated at perisynaptic membrane of neuronal subpopulations as detected by immunogold reaction. *Neuron* 11, 771-787.

Binaei, S., Christensen, M., Murphy, C., Zhang, Q. and Quasney, M. (2003) Beta2-adrenergic receptor polymorphisms in children with status asthmaticus. *Chest* 123, 375S.

Bockaert, J., Marin, P., Dumuis, A. and Fagni, L. (2003) The 'magic tail' of G protein-coupled receptors: an anchorage for functional protein networks. *FEBS Letters* 546, 65-72.

Boeckers, T.M. and Bockmann, J., Kreutz, M.R. and Gundelfinger, E.D. (2002) ProSAP/Shank proteins-a family of higher order organizing molecules of the *Neurochem.* 81, 903-910.

Bourne, H.R., Sanders, D.A. and McCormick, F. (1991) The GTPase superfamily: conserved structure and molecular mechanism. *Nature* 349, 117-127.

Bouvier, M (2001) Oligomerization of G-protein-coupled transmitter receptors. *Nat. Rev. Neurosci.* 2, 274-286.

Braun, J.E.A. and Madison, D.V. (2000) A Novel SNAP25–Caveolin Complex Correlates with the Onset of Persistent Synaptic Potentiation. *J. Neurosci.* 20, 5997–6006.

Brenman, J.E., Chao, D.S., Gee, S.H., McGee, A.W., Craven, S.E., Santillano, D.R., Wu, Z., Huang, F., Xia, H., Peters, M.F., Froehner, S.C., and Bredt, D.S. (1996) Interaction of nitric oxide synthase with the postsynaptic density protein PSD-95 and a-

1 syntrophin mediated by PDZ motifs. *Cell* 84, 757-767.

Brorson, J.R., Bleakman, D., Char, P.S. and Miller, R. J. (1992) Calcium directly permeates kainate a-amino-3-hydroxy-5-methyl-4-isoxasole-propionic acid receptors in cultures cerebellar Purkinje-s neurons. *Mol. Pharmacol.* 41, 603-608.

Brown, D.A. (2001). Lipid droplets : Proteins floating on a pool of fat. *Curr. Biol.* 11 , R446- R449.

Bu, J., Bruckner, S.R., Sengoku, T., Geddes, J.W., and Estus, S. (2003) Glutamate regulates caveolin expression in rat hippocampal neurons. *J. Neurosci. Res.* 72, 185-190.

Burgueño, J., Enrich, C., Canela, E. I., Mallol, J., Lluis, C., Franco, R. and Ciruela, F. (2003a) Metabotropic glutamate type 1a receptor localizes in low-density caveolinrich plasma membrane fractions. *J. Neurochem.* 86, 785-791.

Burgueño, J., Canela, E. I., Mallol, J., Lluis, C., Franco, R. and Ciruela, F. (2003b) Mutual regulation between metabotropic glutamate type 1a receptor and caveolin proteins : from traffick to constitutive activity. Submitted Manuscript.

Burgueño, J., Blake, D.J., Benson, M.A., Tinsley, C. L., Esapa, C.T., Canela, E.I., Penela, P., Mallol, J., Mayor, F. Jr, Lluis, C., Franco, R. and Ciruela, F. (2003c) The adenosine A2A receptor interacts with the actin-binding protein a-actinin. *J. Biol. Chem.* 278, 37545-37552.

Calabresi, P., Saulle, E., Marfia, G.A., Centonze, D., Mulloy, R., Picconi, B., Hipskind, R.A., Conquet, F., and Bernardi, G. (2001) Activation of metabotropic subtype 1/protein kinase C/mitogen activated protein kinase pathway is required for postischemic long-term potentiation in the striatum. *Mol. Pharmacol.* 60, 808-815.

- Cameron, P.L., Ruffin, J.W., Bollag, R., Rasmussen, H., and Cameron, R.S. (1997) Identification of Caveolin and Caveolin-Related Proteins in the Brain. *J. Neurosci.* 17, 9520–9535.
- Canals, M., Marcellino, D., Fanelli, F., Ciruela, F., De Benedetti, P., Goldberg, S.R., Fuxe, K., Agnati, L.F., Woods, A.S., Ferre, S., Lluis, C., Bouvier, M., and Franco, R. (2003a) Adenosine A2A-dopamine D2 receptor-receptor heteromerization. Qualitative and quantitative assessment by fluorescence and bioluminescence energy transfer. *J. Biol. Chem.* Accepted Manuscript.
- Canals, M., Burgueño, J., Marcellino, D., Cabello, N., Canela, E.I., Mallol, J., Agnati, L., Ferré, S., Bouvier, M., Fuxe, K., Ciruela, F., Lluis, C. and Franco, R. (2003b) Homodimerization of adenosine A2A receptors. Qualitative and Quantitative assessment by Fluorescence and Bioluminescence Energy Transfer. *J. Neurochem.* Accepted Manuscript.
- Christerson, L.B., Vanderbilt, C.A., and Cobb, M.H. (1999) MEKK1 interacts with alpha-actinin and localizes to stress fibers and focal adhesions. *Cell Motility and the Cytoskeleton* 43, 186-198.
- Chun, M., Liyanage, U.K., Lisanti, M.P., and Lodish, H.F. (1994) Signal transduction of a G protein-coupled receptor in caveolae: colocalization of endothelin and its receptor with caveolin. *Proc. Natl. Acad. Sci. USA.* 91, 11728–11732.
- Ciruela, F., Casado, V., Mallol, J., Canela, E.I., Lluis, C. and Franco, R. (1995) Immunological identification of A1 receptors in brain cortex. *J. Neurosci. Res.* 42, 818-828.
- Ciruela, F., Soloviev, M.M., Chan, W.Y. and McIlhinney, R.A.J. (2000) Homer-1c/Vesl-1L modulates the cell surface targeting of metabotropic glutamate receptor type

- 1a: evidence for an anchoring function. Mol. Cell. Neurosci. 15, 36-50.
- Ciruela, F., Escriche, M., Burgueno, J., Angulo, E., Casado, V., Soloviev, M.M., Canela, E.I., Mallol, J., Chan, W.Y., Lluis, C., McIlhinney, R. A. J., and Franco, R. (2001) Metabotropic glutamate 1alpha and adenosine A1 receptors assemble into functionally interacting complexes. J. Biol. Chem. 276:18345–18351.
- Ciruela, F., Burgueño, J., Casadó, V., Canals, M., Marcellino, D., Goldberg, S.R., Fuxe, K., Agnati, L., Lluis, C., Franco, R., Ferré, S. and Woods, A. S. (2003) Adenosine D2 receptor-receptor heteromerization. Involvement of epitope-epitope electrostatic interactions. J. Biol. Chem. Submitted Manuscript.
- Conn, P.J. and Pin, J.P. (1997) Pharmacology and functions of metabotropic glutamate receptors. Annu. Rev. Pharmacol. Toxicol. 37, 205-237.
- Conquet, F., Bashir, Z. I., Davies, C. H., Daniel, H., Ferraguti, F., Bordi, F., Franz-Bacon, K., Reggiani, A., Matarese, V., Condé, F., Colin-gridge, G. L., and Crépel, F. (1994) Motor deficit and impairment of synaptic plasticity in mice lacking mGluR1. Nature 372, 237–243.
- Couet, J., Li, S., Okamoto, T., Ikezu, T. and Lisanti, M.P. (1997) Identification of peptide and protein ligands for the caveolin-scaffolding domain. J. Biol. Chem. 272, 6525-6533.
- Couet, J., Belanger, M.M., Roussel, E. and Drolet, M.C. (2001) Cell biology of caveolae and caveolin. Adv. Drug Deliv. Rev. 49, 223-235.
- Crespo, P., Cachero, T.G., Xu, N., and Gutkind, J.S. (1995) Dual effect of adrenergic receptors on mitogen-activated protein kinase. J. Biol. Chem. 270, 25259-25265.
- Cvejic, S. and Devi, L. A. (1997) Dimerization of the d-opioid receptor: implication

- for a role in receptor internalization. *J. Biol. Chem.* 272, 26959–26964.
- DeFea, K.A., Zalevsky, J., Thoma, M.S., Dery, O., Mullins, R.D. and Bunnett, N.W. (2000a) b-arrestin-dependent endocytosis of proteinase-activated receptor 2 is required for intracellular targeting of activated ERK1/2. *J. Cell Biol.* 148, 1267-1281.
- DeFea, K.A., Vaughn, Z.D., O'Bryan, E.M., Nishijima, D., Dery, O. and Bunnett, N.W. (2000b) The proliferative and antiapoptotic effects of substance P are facilitated by formation of a b-arrestin-dependent scaffolding complex. *Proc. Natl. Acad. Sci. USA* 97, 11086-11091.
- de Mendonça, A, and Ribeiro, J.A. (1997) Influence of metabotropic glutamate receptors agonists on the inhibitory effects of adenosine A1 receptor activation in the rat hippocampus. *Br. J. Pharmacol.* 121, 1541-1548.
- Domenici, M.R., Pintor, A., Potenza, R.L., Gaudi, S., Gro, M.C., Passarelli, F., Reggio, R., Galluzzo, M., Massotti, M. and Popoli, P. (2003). Metabotropic glutamate receptor 5 (mGluR5)-mediated phosphoinositide hydrolysis and NMDA-potentiating effects are blunted in the striatum of aged rats: a possible additional mechanism in striatal senescence. *Eur. J. Neurosci.* 17, 2047-2055.
- Wyszynski, M., Martin, D.M., Sheng, M., and Standaert, D.G. (2000) alpha-actinin-2 in rat striatum: localization and interaction with NMDA glutamate receptor subunits. *Brain Res. Mol. Brain Res.* 79, 77-87.
- Dunwiddie, T.V. and Masino S.A. (2001) The role and regulation of adenosine in the central nervous system. *Annu. Rev. Neurosci.* 24, 31–55.
- Enz R. (2002) The actin-binding protein Filamin-A interacts with the metabotropic glutamate receptor type 7. *FEBS Lett.* 514, 184-188.
- Escríche, M., Burgueño, J., Ciruela, F., Canela, E.I., Mallol, J., Enrich, C., Lluis, C.

- and Franco, R. (2003) Ligand-induced caveolae-mediated internalization of A1 adenosine receptors : morphological evidence of endosomal sorting and receptor recycling. *Exp. Cell Res.* 285, 72-90.
- Feoktistov, I. and Biaggioni, I. (1995) Adenosine A2B receptors evoke interleukin-8 secretion in human mast cells: An enprofylline-sensitive mechanism with implications for asthma. *J. Clin. Invest.* 96, 1979-1986.
- Feron, O., Smith, T. W., Michel, T. and Kelly, R. A. (1997) Dynamic targeting of the agonist-stimulated m2 muscarinic acetylcholine receptor to caveolae in cardiac myocytes. *J. Biol. Chem.* 272, 17744-17748.
- Ferré S., von Euler, G., Johansson, B., Fredholm, B.b., and Fuxe, K. (1991) Stimulation of high-affinity adenosine A2 receptors decreases the affinity of dopamine D2 receptors in rat striatal membranes. *Proc. Natl. Acad. Sci. USA* 88, 7238-7241.
- Ferré, S., Popoli, P., Giménez-Llorente, L., Finnman, U.B., Martinez, E., Scotti de Carolis, A., and Fuxe, K. (1994) Postsynaptic antagonistic interaction between adenosine A1 and dopamine D1 receptors. *Neuroreport* 6:73-76.
- Ferré, S., Fredholm,, B.B., Morelli, M., Popoli, P. and Fuxe, K. (1997) Adenosine-dopamine receptor-receptor interactions as an integrative mechanism in the basal ganglia. *Trends Neurosci.* 20, 482-487.
- Ferré, S., Popoli, P., Rimondini, R., Regio, R., Kehr, J., and Fuxe, K. (1999) Adenosine A2A and group I metabotropic glutamate receptors synergistically modulate the binding characteristics of dopamine D2 receptors in the rat striatum. *Neuropharmacology* 39, 129-140.
- Ferre, S., Karcz-Kubicha, M., Hope, B.T., Popoli, P., Burgueño, J., Gutiérrez, M.A., Casadó, V., Fuxe, K., Goldberg, S.R., Lluis, C., Franco, R., and Ciruela, F. (2002)

- Synergistic interaction between adenosine A_{2A} and glutamate mGlu5 receptors: Implications for striatal neuronal function Proc. Natl. Acad. Sci. 99, 11940-11945.
- Flatman, J.A., Schwindt, P.C., Crill, W.E. and Stafstrom, C.E. (1983) Multiple actions on N-methyl-D-aspartate on cat neocortical neurons in vitro. Brain Res. 266, 169-173.
- Flower, D.R. (1999) Modelling G-protein-coupled receptors for drug design. Biochim Biophys Acta 1422, 207–234.
- Franco, R., Ferré, S., Agnati, L., Torvinen, M., Gines, S., Hillion, J., Casado, V., Lledo, P.M., Zoli, M., Lluis, C., Fuxé, K. (2000) Evidence for adenosine/dopamine receptor interactions: indications for heteromerization. Neuropsychopharmacology 23, S50-S59.
- Franco, R., Canals, M., Marcellino, D., Ferre, S., Agnati, L., Mallol, J., Casado, V., Ciruela, F., Fuxé, K., Lluis, C., and Canela, E.I. (2003) Regulation of heptaspanningmembrane-receptor fuction by dimerization and clustering. TIBS 28, 238-243.
- Fraser, C.M., Chung, F.-Z., Wang, C.D. and Venter, J.C. (1988). Site-directed mutagenesis of human α -adrenergic receptors: substitution of aspartic acid-130 by asparagine produces a receptor with high affinity agonist binding that is uncoupled from adenylate cyclase. Proc. Natl. Acad. Sci. USA. 85, 5478-5482.
- Fredriksson, R., Lagerstrom, M.C., Lundin, L.G., and Schioth, H.B. (2003) The Gprotein coupled receptors in the human genome form five main families. Phylogenetic analysis, paralogon groups and fingerprints. Mol. Pharmacol. 63, 1256-1272.
- Freedman, N.J. and Lefkowitz, R.J. (1996) Desensitization of G protein-coupled receptors. Recent Prog. Horm. Res. 51, 319-351.
- Freissmuth, M. Schütz, W. and Linder, M.E. (1991) Interactions of the bovine brain

A1-adenosine receptor with recombinant G-protein α -subunits. Selectivity for rGia-3. J. Biol. Chem. 266, 17778-17783.

Fujimoto, T., Kogo, H., Ishiguro, K., Tauchi, K. and Nomura, R. (2001). Caveolin-2 is targeted to Lipid Droplets, a new “membrane domain” in the cell. J. Cell Biol. 152, 1079-1085.

Fuxe K., Ferré S., Zoli M., and Agnati L.F. (1998) Integrated events in central dopamine transmission as analyzed at multiple levels. Evidence for intramembrane adenosine A2A/dopamine D2 and adenosine A1/dopamine D1 receptor interactions in the basal ganglia. Brain Res Rev 26:258–273.

Galbiati, F., Volonte, D., Gil, O., Zanazzi, G., Salzer, J.L., Sargiacomo, M., Scherer, P.E., Engelman, J.A., Schlegel, A., Parenti, M., Okamoto, T. and Lisanti, M.P. (1998) Expression of caveolin-1 and -2 in differentiating PC12 cells and dorsal root ganglion neurons: caveolin-2 is up-regulated in response to cell injury. Proc.Natl.Acad.Sci. USA 95, 10257-10262.

Gama L., Wilt S.G. and Breitwieser G.E. (2001). Heterodimerization of calcium sensing receptors with metabotropic glutamate receptors in neurons. J. Biol.Chem. 276, 39053-39059.

George, S.R., Fan, T., Xie, Z., Tse, R., Tam, V., Varghese, G., O'Dowd, B.F. (2000) Oligomerization of m- and d -opioid receptors. Generation of novel functional properties. J. Biol. Chem. 275, 26128–26135.

Gerwins, P. and Fredholm, B.B. (1992) Stimulation of A1 adenosine receptors and bradykinin receptors, which act via different G protein, synergistically raises inositol 1,4,5-triphosphate and intracellular free calcium in DDT1MF-2 smooth muscle cells. Proc. Natl. Acad. Sci. USA 89, 7330-7334.

Gether, U. (2000) Uncovering molecular mechanisms involved in activation of G protein-coupled receptors. *Endocrine reviews* 21, 90-113.

Gines S., Hillion J., Torvinen M., LeCrom S., Casado V., Canela E., Rondin S., Lew J., Watson S., Zoli, M., Agnati, L.F., Verniera, P., Lluis, C., Ferre, S., Fuxe, K., and Franco, R. (2000) Dopamine D1 and adenosine A1 receptors assemble into functionally interacting heteromeric complexes. *Proc Natl Acad Sci USA* 97:8606–8611

Gines, S., Ciruela, F., Burgueno, J., Casado, V., Canela, E.I., Mallol, J., Lluis, C. and Franco, R. (2001) Involvement of caveolin in ligand-induced recruitment and internalization of A1 adenosine receptor and adenosine deaminase in an epithelial cell line. *Mol Pharmacol.* 59,1314-1323.

Gouldson, P.R., Higgs, C., Smith, R.E., Dean, M.K., Gkoutos, G.V. and Reynolds, C.A. (2000) Dimerization and domain swapping in G-protein-coupled receptors. A computational study. *Neuropsychopharmacology* 23, S60-S77.

Hamm, H.E. (1998) The many faces of G protein signalling. *J.Biol.Chem.* 273, 669-672.

Hanley, J.G., Koulen, P., Bedford, F., Gordon-Weeks, P.R., and Moss, S.J. (1999) The protein MAP-1B links GABA(C) receptors to the cytoskeleton at retinal synapses. *Nature* 397, 66-72.

Harder, T. and Simons, K. (1997) Caveolae, DIGs, and the dynamics of sphingolipid-cholesterol microdomains. *Curr. Opin. Cell. Biol.* 9, 534-542.

Harris, B.Z. and Lim, W.A. (2001) Mechanism and role of PDZ domains in signalling complex assembly. *J.Cell Sci.* 114, 3219-3231.

1996) A peptide derived from a b2-adrenergic receptor transmembrane domain inhibits both receptor dimerization and activation. *J.Biol.Chem.* 271, 16384-

16392.

- Hering, H. and Sheng, M. (2001) Dendritic spines : structure, dynamics and regulation. *Nature Rev. Neurosci.* 2, 880-888.
- Hermans, E. and Challiss, R.A.J. (2001) Structural, signalling and regulatory properties of the group I metabotropic glutamate receptors: prototypic family C Gprotein-coupled receptors. *Biochem. J.* 359, 465-484.
- Hettinger, B.D., Lee, A., Linden, J., and Rosin, D.L. (2001) Ultrastructural localization of adenosine A_{2A} receptors suggests multiple cellular sites for modulation of GABAergic neurons in rat striatum. *J. Comp. Neurol.* 431, 331-346.
- Heuss, C. and Gerber, U. (2000) G-protein-independent signaling by G-protein-coupled receptors. *Trends Neurosci.* 23, 469-475.
- Hillion J., Canals M., Torvinen M., Casadó V., Scott R., Terasmaa A., Hansson A., Watson S., Olah M.E., Mallol J., Canela E.I., Zoli M., Agnati L.F., Ibáñez C.F., Lluis C., Franco R., Ferré S., and Fuxe K. (2002) Coaggregation, cointernalization and codesensitization of adenosine A_{2A} receptors and dopamine D₂ receptors *J. Biol. Chem.* 277, 18091-18097.
- Hjälm, G., MacLeod, R.J., Kifor, O., Chatopadhyay, N., and Brown, E.M. (2001) Filamin-A binds to the carboxyl-terminal tail of the calcium-sensing receptor, an interaction that participates in CaR-mediated activation of mitogen-activated protein kinase. *J. Biol. Chem.* 276, 34880-34887.
- Houamed, K. M., Kuijper, J. L., Gilbert, T. L., Haldeman, B. A., O'Hara, P. J., Mulvihill, E. R., Almers, W., and Hagen, F. S. (1991) Cloning, expression, and gene structure of a G-protein-coupled glutamate receptor from rat brain. *Science* 252, 1318-1321.

- Huber, A. (2001) Scaffolding proteins organize multimolecular protein complexes for sensory signal transduction. *Eur. J. Neurosci.* 14, 769-776.
- Ishizaka, N., Griendling, K., Lassegue, B. and Alexander, R. W. (1998) Angiotensin II Type 1 receptor: relationship with caveolae and caveolin after initial agonist stimulation. *Hypertension*. 32, 459–466.
- Jordan, B.A. and Devi, L.A. (1999) G-protein-coupled receptor heterodimerization modulates receptor function. *Nature* 399, 697-700.
- in caveolin-rich plasma membrane domains of bovine parathyroid cells. *J. Biol.Chem.*273, 21708- 21713.
- Kim, E., Niethammer, M., Rothschild, A., Jan, Y.N. and Sheng, M. (1995) Clustering of Shaker-type K⁺ channels by direct interaction with the PSD-95/SAP90 family of membrane-associated guanylate kinases. *Nature* 378, 85-88.
- Kim, E., Naisbitt, S., Hsueh, Y.P., Rao, A., Rothschild, A., Craig, A.M., and Sheng, M. (1997) GKAP, a novel synaptic protein that interacts with the guanylate kinase-like domain of the PSD-95/SAP90 family of channel clustering molecules. *J.Cell Biol.* 136, 669-678.
- Kim, M., Jiang, L., Wilson, H.L., North, R.A., and Surprenant, A. (2001) Proteomic and functional evidence for a P2X7 receptor signalling complex. *EMBO J.* 20, 6347-6358.
- Kogo H., Ishiguro, K., Kuwaki, S., and Fujimoto, T. (2002) Identification of a splice variant of mouse caveolin-2 mRNA encoding an isoform lacking the C-terminal domain. *Arch. Biochem. Biophys.* 401, 108-114.
- Kolakowski, Jr. L.F. (1994) GCRDb: a G-protein-coupled receptor database. *Receptors Channels* 2, 1-7.

Kournau, H.C., Schenker, L.T., Kennedy, M.B. and Seeburg, P.H. (1995) Domain interaction between NMDA receptor subunits and the postsynaptic density protein PSD-95. *Science* 269, 1737-1740.

Kreienkamp, H.J., Zitzer, H., Gundelfinger, E.D., Richter, P., and Bockers, T.M. (2000) The calcium-independent receptor for alpha-latrotoxin from human and rodent brains interacts with members of the ProSAP/SSTRIP/Shank family of multidomain proteins. *J. Biol. Chem.* 275, 32387-32390.

Kreienkamp, H.J. (2002) Organisation of G-protein-coupled receptor signalling complexes by scaffolding proteins. *Curr. Opin. Pharmacol.* 2, 581-586.

Krupp, J.J., Vissel, B., Thomas, C.G., Heinemann, S.F., and Westbrook, G.L. (1999) Interactions of calmodulin and a-actinin with the NR1 subunit modulate Ca²⁺-dependent inactivation of NMDA receptors. *J. Neurosci.* 19, 1165-1178.

Kull, B., Ferré, S., Arslan, G., Svenningsson, P., Fuxe, K., Owman, C. and Fredholm, B.B. (1999) Reciprocal interactions between adenosine A2A and dopamine D2 receptors in Chinese hamster ovary cells co-transfected with the two receptors. *Biochem. Pharmacol.* 58, 1035-1045.

Kull, B., Svenningsson, P. and Fredholm, B.B. (2000) Adenosine A(2A) receptors are colocalized with and activate g(olf) in rat striatum. *Mol. Pharmacol.* 58, 771-777.

Kurzchalia, T.V., and Parton, R.G. (1999) Membrane microdomains and caveolae. *Curr. Opin. Cell. Biol.* 11, 424-431.

Lasley, R. D., Narayan, P., Uittenbogaard, A. and Smart, E. J. (2000) Activated cardiac adenosine A1 receptors translocate out of caveolae. *J. Biol. Chem.* 275: 4417-4421.

Labrecque, L., Royal, I., Surprenant, D.S., Patterson, C., Gingras, D., and Bélineau,

R. (2003). Regulation of vascular endothelial growth factor receptor-2 activity by caveolin-1 and plasma membrane cholesterol. *Mol. Biol. Cell* 14, 334-347.

Lamaze, C., Fujimoto, L.M., Yin, H.L., and Schmid, S.L. (1997) The actin cytoskeleton is required for receptor-mediated endocytosis in mammalian cells. *J. Biol. Chem.* 272, 20332-20335.

Lee, S.P., Xie, Z., Varghese, G., Nguyen, T., O'Dowd, B.F. and George, S.R.

(2000) Oligomerization of dopamine and serotonin receptors.

Neuropsychopharmacology 23, S32-S40.

Leinweber, B.D., Leavis, P.C., Grabarek, Z., Wang, C.L., and Morgan, K.G. (1999)

Extracellular regulated kinase (ERK) interaction with actin and the calponin homology (CH) domain of actin-binding proteins. *Biochem. J.* 344, 117-123.

Lefkowitz, R.J. (1998) G protein-coupled receptors. III. New roles for receptor kinases and beta-arrestins in receptor signalling and desensitisation. *J.Biol.Chem.* 273, 18677-18680.

Li, M., Bermak, J.C., Wang, Z.W. and Zhou, Q.Y. (2000) Modulation of dopamine D2 receptor signaling by actin-binding protein (ABP-280). *Mol. Pharmacol.* 57, 446-452.

Li, S., Galbiati, F., Volonte, D., Sargiacomo, M., Engelman, J.A., Das, K., Scherer, P.E. and Lisanti, M.P. (1998) Mutational analysis of caveolin-induced vesicle formation. Expression of caveolin-1 recruits caveolin-2 to caveolae membranes. *FEBS Lett.* 434, 127- 134.

Limbird, L.E., Meyts, P.D. and Lefkowitz, R.J. (1975) Beta-adrenergic receptors: evidence for negative cooperativity. *Biochem. Biophys.Res.Commun.* 64, 1160-1168.

Lin, R., Karpa, K., Kabbani, N., Goldman-Rakic, P. and Levenson, R. (2001)

Dopamine D2 and D3 receptors are kinked to the actin cytoskeleton via interaction with filamin A. Proc. Natl. Acad. Sci. 98, 5258-5263.

Liu, J., Ying, Y. and Anderson, R.G.W. (1997). Platelet-derived growth factor activates mitogen-activated protein kinase in isolated caveolae. Proc. Natl. Acad. Sci. U.S.A. 94, 13666-13670.

Londos, C., Cooper, D.M.F. and Wolff, J. (1980) Subclasses of external adenosine receptors. Proc. Natl. Acad. Sci. USA 74, 5482-5486.

Lu, D., Yan, H., Othman, T., Turner, C.P., Woolf, T.B., and Rivkees, S.A. (2003) Cytoeskeletal protein 4.1G binds to the third intracellular loop of the A1 adenosine receptor and inhibits receptor action. Biochem. J. Accepted Manuscript.

Lu, Y. M., Jia, Z., Janus, C., Henderson, J. T., Gerlai, R., Wojtowicz, J. M., and Roder, J. C. (1997) Mice lacking metabotropic glutamate receptor 5 show impaired learning and reduced CA1 long-term potentiation (LTP) but normal CA3 LTP. J Neurosci 17, 5196– 5205.

Lujan R., Nusser Z., Roberts J. D. B., Shigemoto R. and Somogyi P. (1996) Perisynaptic location of metabotropic glutamate receptors mGluR1 and mGluR5 on dendrites and dendritic spines in the hippocampus. Eur. J. Neuroscience 8, 1488-1500.

Lunn J.A., Wong H., Rozengurt E., and Walsh J.H. (2000) Requirement of cortical actin organization for bombesin, endothelin, and EGF receptor internalization. Am. J. Physiol. Cell Physiol. 279, C2019-C2027.

Luttrell, L.M., Ferguson, S.S.G., Daaka, Y., Miller, W.E., Maudsley, S., Della Rocca, G.J., Lin, F., Kawakatsu, H., Owada, K., Luttrell, D.K., Caron, M.G. and Lefkowitz, R.J. (1999) Beta-arresitn-dependent formation of beta2-adrenergic receptors/cr protein kinase complexes. Science 283, 655-661.

- Luttrell, L.M. and Lefkowitz, R.J. (2002) The role of b-arrestins in the termination and transduction of G-protein-coupled receptor signals. *J. Cell Sci.* 115, 455-465.
- Macdonald, R.L., Skerritt, J.H., and Werz, M.A. (1986) Adenosine agonists reduce voltage-dependent calcium conductance of mouse sensory neurones in cell culture. *J. Physiol.* 370, 75–90.
- Madore, N., Smith, K.L., Graham, C.H., Jen, A., Brady, K., Hall, S. and Morris, R. (1999) Functionally different GPI proteins are organized in different domains on the neuronal surface. *EMBO J.* 18, 6917-6926.
- Maekawa, S., Iino, S. and Miyata S. (2003) Molecular characterization of the detergent-insoluble cholesterol-rich membrane microdomain (raft) of the central nervous system. *Biochim. Biophys. Acta* 1610, 261– 270
- Maggio, R., Vogel, Z. And Wess, J. (1993) Co-expression studies with mutant muscarinic/adrenergic receptors provide evidence for intermolecular “cross-talk” between G-protein-linked receptors. *Proc.Natl.Acad.Sci. USA* 90, 3103-3107.
- Margeta-Mitrovic, M., Jan, Y.N. and Jan, L.Y. (2000) A trafficking checkpoint controls GABA(B) receptor heterodimerization. *Neuron* 27, 97-106.
- Marti, A., Luo, Z., Cunningham, C., Ohta, Y., Hartwig, J., Stossel, T.P., Kyriakis, J.M. and Avruch, J. (1997) Actin-binding protein-280 binds the stress-activated protein kinase (SAPK) activator SEK-1 and is required for tumor necrosis factor-alpha activation of SAPK in melanoma cells. *J. Biol. Chem.* 272, 2620-2628.
- Masu, M., Tanabe, Y., Tsuchida, K., Shigemoto, R., and Nakanishi, S. (1991) Sequence and expression of a metabotropic glutamate receptor. *Nature* 349, 760– 765.
- McGee, A.W. and Bredt, D.S. (1999) Identification of an intramolecular interaction between the SH3 and guanylate kinase domains of PSD-95. *J. Biol. Chem.* 274, 17431-

17436.

- McVey, M., Ramsay, D., Kellett, E., Rees, S., Wilson, S., Pope, AJ. and Milligan, G. (2001) Monitoring receptor oligomerization using time-resolved fluorescence resonance energy transfer and bioluminescence resonance energy transfer: the human d-opioid receptor displays constitutive oligomerization at the cell surface which is not regulated by receptor occupancy. *J.Biol.Chem.* 276, 14092-14099.
- Missale, C., Nash, S.R., Robinson, S.W., Jaber, M., and Caron, M.G. (1998) Dopamine receptors: from structure to function. *Physiol. Rev.* 78, 189–225.
- Mora, R., Bonilha, V.L., Marmorstein, A., Scherer, P.E., Brown, D., Lisanti, M.P. and Rodriguez-Boulan, E. (1999) Caveolin-2 localizes to the golgi complex but redistributes to plasma membrane, caveolae, and rafts when co-expressed with caveolin-1. *J. Biol. Chem.* 274, 25708-25717.
- Munn, A.L. (2001) Molecular requirements for the internalisation step of endocytosis: insights from yeast. *Biochim. Biophys. Acta* 1535, 236-257.
- Munshi, R., Pang, I-H., Sternweis, P.C. and Linden, J. (1991) A1 adenosine receptors of bovine brain couple to guanine nucleotide-binding proteins Gi1, Gi2 and Go. *J. Biol. Chem.* 266, 22285-22289.
- Nabi, I.R. and Le, P.U. (2003) Caveolae/raft-dependent endocytosis. *J. Cell Biol.* 161, 673-677.
- Nicola, S.M., Surmeier, D.J., and Malenka R.C. (2000) Dopaminergic modulation of neuronal excitability in the striatum and nucleus accumbens. *Annu. Rev. Neurosci.* 23, 185–215
- Nicoletti, F., Wroblewski, J. T., Novelli, A., Alho, H., Guidotti, A., & Costa, E. (1986) The activation of inositol phospholipid metabolism as a signal-transduction

system for excitatory amino acids in primary cultures of cerebellar granule cells. *J Neurosci.* 6, 1905– 1911.

Nishiyama, K., Trapp, B.D., Ikezu, T., Ransohoff, R.M., Tomita, T., Iwatsubo, T., Kanazawa, I., Hsiao, K.K., Lisanti, M.P. and Okamoto, T. (1999) Caveolin-3 upregulation activates b-secretase-mediated cleavage of the amyloid precursor protein in alzheimer's disease. *J.Neurosci.* 19, 6538-6548.

Okamoto, T., Schlegel, A., Scherer, P.E., and Lisanti, M.P. (1998) Caveolins, a family of scaffolding proteins for organizing “preassembled signaling complexes” at the plasma membrane. *J. Biol. Chem.* 273, 5419-5422.

Ostermeyer, A.G., Paci, J.M., Zeng, Y., Lublin, D.M., Munro, S., and Brown, D.A. (2001) Accumulation of caveolin in the endoplasmic reticulum redirects the protein to lipid storage droplets . *J. Cell Biol.* 152, 1071-1078.

Palmer, T.M., Gettys, T.W. and Stiles, G.L. (1995) Differential interaction with and regulation of multiple G-proteins by the rat A3 adenosine receptors. *J. Biol. Chem.* 270, 16895-16902.

Parolini, I., Sargiacomo, M., Galbiati, F., Rizzo, G., Grignani, F., Engelman, J.A., Okamoto, T., Ikezu, T., Scherer, P.E., Mora, R., Rodriguez-Boulan, E., Peschle, C. and Lisanti, M.P. (1999) Expression of caveolin-1 is required for the transport of caveolin-2 to the plasma membrane. *J. Biol. Chem.* 274, 25718- 25725.

Perry, S.J. and Lefkowitz, R.J. (2002) Arresting developments in heptahelical receptor signaling and regulation. *Trends Cell Biol.* 12, 130-138.

Pierce, K.L., Luttrell, I.M. and Lefkowitz, R.J. (2001) New mechanisms in heptahelical receptor signaling to mitogen activated protein kinase cascades. *Oncogene* 20, 1532-1539.

- Pike, L.J. (2003) Lipid rafts: bringing order to chaos. *J. Lipid Res.* 44, 655–667.
- Pin, J.P., Galvez, T. and Prézeau, L. (2003) Evolution, structure, and activation mechanism of family 3/C G-protein-coupled receptors. *Pharmacol. Ther.* 98, 325-354.
- Pintor, A., Potenza, R.L., Domenici, M.R., Tiburzi, F., Regio, R., Pezzola, A. And Popoli, P. (2000). Age-related decline in the functional response of striatal group I mGlu receptors. *Neuroreport* 11, 3033-3038.
- Pol, A., Luetterforst, R., Lindsay, M., Heino, S., Ikonen, E. and Parton, R.G. (2001) A caveolin dominant negative mutant associates with lipid bodies and induces intracellular cholesterol imbalance. *J. Cell Biol.* 152, 1057-1070.
- Pol, A., Martin, S., Fernandez, M.A., Ferguson, C., Carozzi, A., Luetterforst, R., Enrich, C., and Parton, R.G. (2003) Dynamic and regulated association of caveolin with lipid bodies: modulation of lipid body motility and function by a dominant negative mutant. *Mol. Biol. Cell In Press*.
- Probst, W.C., Snyder, L.A., Schuster, D.I., Brosius, J., and Sealfon, S.C. (1992) Sequence alignment of the G-protein coupled receptor superfamily. *DNA Cell. Biol.* 11, 1-20.
- Pumain, R., Kurcewicz, I. and Louevel, J. (1986) Ionic changes-induced by excitatoty amino acids in the rat cerebral cortes. *Can. J. Physiol. (Lond.) Pharmacol.* 65, 1067-1077.
- Ray, K. and Hauschild, B. C. (2000). Cys-140 is critical for metabotropic glutamate receptor-1 (mGluR-1) dimerization. *J. Biol. Chem.* 275, 34245-34251.
- Razani, B., and Lisanti, M.P. (2001) Two distinct caveolin-1 domains mediate the functional interaction of caveolin-1 with protein kinase A. *Am. J. Physiol. Cell Physiol.* 281, C1241-C1250.

- Razani, B., Lan Zhang, X., Bitzer, M., von Gersdorff, G., Böttinger, E.P. and Lisanti, M.P. (2001). Caveolin-1 regulates transforming growth factor (TGF)-b/SMAD signaling through an interaction with the TGF-b type I receptor. *J. Biol. Chem.* 276, 6727-6738.
- Robbins, M.J., Ciruela, F., Rhodes, A. and McIlhinney, R.A. J. (1999) Characterization of the dimerization of metabotropic glutamate receptors using an Nterminal truncation of mGluR1alpha. *J. Neurochem.* 72, 2539-2547.
- Rocheville, M., Lange, D.C., Kumar, U., Sasi, R., Patel, R.C., and Patel, Y.C. (2000a) Subtypes of the somatostatin receptor assemble as functional homo- and heterodimers. *J. Biol. Chem.* 275, 7862-7869.
- Rocheville, M., Lange, D.C., Kumar, U., Patel, S.C., Patel, R.C., and Patel, Y.C. (2000b) Receptors for dopamine and somatostatin: formation of hetero-oligomers with enhanced functional activity. *Science* 288, 154-157.
- Romano, C., Yang, W.L. and O'Malley, K.L. (1996) Metabotropic glutamate receptor 5 is a disulfide-linked dimer. *J.Biol.Chem.* 271, 28612-28616.
- Romano, C., Miller, J.K., Hyrc, K., Dikranian, S., Mennerick, S., Takeuchi, Y., Goldberg, M.P. and O'Malley, K.L. (2001) Covalent and noncovalent interactions mediate metabotropic glutamate receptor mGlu(5) dimerization. *Mol.Pharmacol.* 59, 46-53.
- Röper, K., Corbei, D. and Huttner, W.B. (2000) Retention of prominin in microvilli reveals distinct cholesterol-based lipid microdomains in the apical plasma membrane. *Nature Cell Biol.* 2 , 582-592.
- Rothberg, K.G., Heuser, J.E., Donzell, W.C., Ying, Y.S., Glenney, J.R., Anderson, R.G. (1992) Caveolin, a protein component of caveolae membrane coats. *Cell* 68, 673-

- Rybin, V.O., Xu ,X., Lisanti, M.P., and Steinberg, S.F. (2000) Differential targeting of b-adrenergic receptor subtypes and adenylyl cyclase to cardiomyocyte caveolae. *J. Biol. Chem.* 275, 41447–41457.
- Sargiacomo, M., Scherer, P.E., Tang, Z., Kubler, E., Song, K.S., Sanders, M.C. and lisanti, M.P. (1995) Oligomeric structure of caveolin: implications for caveolae membrane organization. *Proc.Natl.Acad.Sci. USA* 92, 9407-9411.
- Scarselli, M., Armogida, M., Chiacchio, S., DeMontis, M. G., Colzi, A., Corsini, G. U. and Maggio, R. (2000) Reconstitution of functional dopamine D(2s) receptor by coexpression of amino and carboxyl-terminal receptor fragments. *Eur. J. Pharmacol.* 397, 291-296.
- Scherer, P.E., Tang, Z., Chun, M., Sargiacomo, M., Lodish, H.F. and Lisanti, M.P. (1995) Caveolin isoforms differ in their N-terminal protein sequence and subcellular distribution. Identification and epitope mapping of an isoform-specific monoclonal antibody probe. *J. Biol. Chem.* 270, 16395-16401.
- Scherer, P.E., Okamoto, T., Chun, M., Lodish, H.F. and Lisanti, M.P. (1996) Identification, sequence, and expression of caveolin-2 defines a caveolin gene family. *Proc. Natl. Acad. Sci. USA* 93, 131-135.
- Scherer, P.E., Lewis, R.Y., Volonte, D., Engelman, J.A., Galbiati, F., Couet J., Kohtz, D.S., van Donselaar, E., Peters, P. and Lisanti, M.P. (1997) Cell-type and tissuespecific expression of caveolin-2. Caveolins 1 and 2 co-localize and form a stable hetero-oligomeric complex in vivo. *J. Biol. Chem.* 272, 29337–29346.
- Schlegel, A., and Lisanti, M.P. (2001). Caveolae and their coat proteins, the caveolins: from electron microscopic novelty to biological launching pad. *J. Cell.*

Physiol. 186, 329-337.

Schmedtje, J.F. Jr., Evans, G.W., Byerly, W., King, M., Goonan, K., Blastock-Glenn, C., Croft, J.B. and Goff, D.C. Jr. (2003) Treatment of chronic heart failure in a managed care setting. Baseline results from the Achieving Cardiac Excellence Project. N.C.Med.J. 64, 4-10.

Schreiber, S., Fleischer, J., Breer, H., and Boekhoff, I. (2000) A Possible Role for Caveolin as a Signaling Organizer in Olfactory Sensory Membranes. *J. Biol. Chem.* 275, 24115–24123.

Schulz, A., Grosse, R., Schultz, G., Gudermann, T. and Schoneberg, T. (2000) Structural implication for receptor oligomerization from functional reconstitution studies of mutant V2 vasopressin receptors. *J. Biol. Chem.* 275, 2381-2389.

Seifert, R., and Wenzel-Seifert, K. (2002) Constitutive activity of G-protein-coupled receptors: cause of disease and common property of wild-type receptors. *Naunyn Schmiedebergs Arch. Pharmacol.* 366, 381-416.

Sheng, M. and Kim, E. (2000) The Shank family of scaffold proteins. *J.Cell Sci.* 113, 1851-1856.

Shin, H., Hsueh, Y.P., Yang, F.C., Kim, E., and Sheng, M. (2000) An intramolecular interaction between Src homology 3 domain and guanylate kinase-like domain required for channel clustering by postsynaptic density-95/SAP90. *J. Neurosci.* 20, 3580-3587.

Simons, K. and Ikonen, E. (1997) Functional rafts in cell membranes. *Nature* 387, 569-572.

Sladeczek, F., Pin, J.-P., Recasens, M., Bockaert, J., and Weiss, S. (1985) Glutamate stimulates inositol phosphate formation in striatal neurones. *Nature* 317, 717– 719.

- Smith, Y., Charara, A., Hanson, J.E., Paquet, M and Levey, A.I. (2000) GABA(B) and group I metabotropic glutamate receptors in the striatopallidal complex in primates. *J. Anat.* 196, 555-576.
- Stan, R.V. (2002) Structure and function of endothelial caveolae. *Microsc.Res.Tech.* 57, 350-364.
- Sugiyama, H., Ito, I., and Hirono, C. (1987) A new type of glutamate receptor linked to inositol phospholipid metabolism. *Nature* 325, 531– 533.
- Suzuki T., Ito J-I., Takagi H., Saitoh F., Nawa H. and Shimizu H. (2001) Biochemical evidence for localization of AMPA-type glutamate receptor subunits in the dendritic raft. *Mol. Brain Res.* 89, 20-28.
- Suzuki, T . (2002) Lipid rafts at postsynaptic sites: distribution, function and linkage to postsynaptic density. *Neurosci. Res.* 44, 1-9.
- Sweatt, J. D. (2001) The neuronal MAP kinase cascade: a biochemical signal integration system subserving synaptic plasticity and memory. *J. Neurochem.* 76, 1–10.
- Tang, Z.-L., Scherer, P.E., Okamoto, T., Song, K., Chu, C., Kohtz, D. S., Nishimoto, I., Lodish, H.F. and Lisanti, M.P. (1996) Molecular cloning of caveolin-3, a novel member of the caveolin gene family expressed predominantly in muscle. *J. Biol. Chem.* 271, 2255-2261.
- Testa, C.M., Standaert, D.G., Landwehrmeyer, G.B., Penney, J.B., and Young, A.B. (1995) Differential expression of mGluR5 metabotropic glutamate receptor mRNA by rat striatal neurons. *J. Comp. Neurol.* 354, 241-252.
- Thomas, U. (2002) Modulation of synaptic signalling complexes by Homer proteins. *J.Neurochem.* 81, 407-413.
- Tom, N.J. and Roberts, P.J. (1999) Group 1 mGlu receptors elevate [Ca²⁺] in rat

cultured cortical type 2 astrocytes: [Ca²⁺] synergy with adenosine A1 receptors.

Neuropharmacology 38,1511-1517.

Trussell, L.O. and Jackson, M.B. (1985) Adenosine-activated potassium conductance in cultured striatal neurons. Proc. Natl. Acad. Sci. USA 82, 4857-4861.

Tsuji, Y., Shimada, Y., Takeshita, T., Kajimura, N., Nomura, S., Sekiyama, N., Otomo, J., Usukura, J., Nakanishi, S. and Jingami, H. (2000). Cryptic dimer interface and domain organization of the extracellular region of metabotropic glutamate receptor subtype 1. J. Biol. Chem. 275, 28144-28151.

Tu, J.C., Xiao, B., Yuan, J.P, Lanahan, A.A., Leoffert, K., Li, M., Linden, D.J. and Worley, P.F. (1998) Homer binds a novel prolin-rich motif and links group I metabotropic glutamate receptors with IP₃ receptors. Neuron 21, 717-726.

Uittenbogaard, A., and Smart, E.J. (2000) Palmitoylation of caveolin-1 is required for cholesterol binding, chaperone complex formation and rapid transport of cholesterol to caveolae. J.Biol.Chem. 275, 25595-25599.

van der Flier, A. and Sonnenberg, A. (2001) Structural and functional aspects of filamins. Biochim.Biophys.Acta 1538, 99-117.

Hohmann, J.G., Zeng, H., Li, F., Ranchalis, J.E., Mortrud, M.T., Brown, A., Rodríguez, S.S., Weller, J.R., Wright, A.C., Bergmann, J.E. and Galtanaris, G.A. (2003) The G protein-coupled receptor repertoires of human and mouse. Proc. Natl. Acad. Sci. USA 100, 4903-4908.

Way, M. and Parton, R.G. (1996) M-caveolin, a muscle-specific caveolin-related protein FEBS Lett 378, 108–112.

Wheaton, K., Sampsel, K., Boisvert, F.M., Davy, A., Robbins, S. and Riabowol, K. (2001). Loss of functional caveolae during senescence of human fibroblasts. J. Cell.

Physiol. 187, 226-235.

- White, J.H., Wise, A., Main, M.J., Green, A., Fraser, N.J., Disney, G.H., Barnes, A.A., Emson, P., Foord, S.M., and Marshall, F.H. (1998) Heterodimerization is required for the formation of a functional GABA(B) receptor. *Nature* 396, 679-682.
- Wirkner, K., Assmann, H., Köles, L., Gerevich, Z., Franke, H., Nörenberg, W., Boehm, R., and Illes, P. (2000) Inhibition by adenosine A(2A) receptors of NMDA but not AMPA currents in rat neostriatal neurons. *Br. J. Pharmacol.* 130, 259-269.
- Woods, A. S., and Huestis, M. A. (2001) A study of peptide-peptide interaction by matrix-assisted laser desorption/ionisation. *JASMS* 12, 88-96.
- Woods, A. S., Koomen, J., Ruotolo, B., Gillig, K. J., Russell, D. H., Fuhrer, K., Gonin, M., Egan, T., and Schultz, J. A. (2002) A study of peptide-peptide interactions using MALDI ion mobility o-TOF and ESI mass spectrometry. *JASMS* 13, 166-169.
- Wreggett, K.A. and Wells, J.W. (1995) Cooperativity manifest in the binding properties of purified cardiac muscarinic receptors. *J.Biol.Chem.* 270, 22488-22499.
- Yamamoto, J., Nagao, M., Kaziro, Y., nadito, H. (1997) Activation of p38 mitogenactivated protein kinase by signaling through G protein-coupled receptors. Involvement of Gi and Gq/11 subunits. *J.Biol.Chem.* 272, 27771-27777.
- Zhou, Q.Y., Li, C., Olah, M.E., Johnson, R.A., Stiles, G.L. and Civelli, O. (1992) Molecular cloning and characterization of an adenosine receptor: The A3 adenosine receptor. *Proc. Natl. Acad. Sci. USA* 89, 7432-7436.
- Zitzer, H., Richter, D., and Kreienkamp, H.J. (1999) Agonist-dependent interaction of the rat somatostatin receptor subtype 2 with cortactin binding protein. *J.Biol.Chem.* 274, 18153-18156.